

## Refine Search

### Search Results -

Term	Documents
324/300	628
324/300S	0
324/301	309
324/301S	0
324/302	47
324/302S	0
324/303	608
324/303S	0
324/304	183
324/304S	0
324/305	27
(L1 AND 324/300- 324.CCLS. ).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	22

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### Search History

DATE: Monday, February 20, 2006 [Printable Copy](#) [Create Case](#)

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DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ

<u>L3</u>	L1 and 324/300-324.ccls.	22	<u>L3</u>
<u>L2</u>	L1 and saddle	7	<u>L2</u>
<u>L1</u>	5394087	29	<u>L1</u>

END OF SEARCH HISTORY

<u>L3</u>	L1 and 324/300-324.ccls.	22	<u>L3</u>
<u>L2</u>	L1 and saddle	7	<u>L2</u>
<u>L1</u>	5394087	29	<u>L1</u>

END OF SEARCH HISTORY

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324/304	183
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(L1 AND 324/300- 324.CCLS. ).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	22

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*DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ*

<u>L3</u>	L1 and 324/300-324.ccls.	22	<u>L3</u>
<u>L2</u>	L1 and saddle	7	<u>L2</u>
<u>L1</u>	5394087	29	<u>L1</u>

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## Hit List

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Search Results - Record(s) 1 through 7 of 7 returned.

☐ 1. Document ID: US 6377836 B1 Relevance Rank: 59

**Using default format because multiple data bases are involved.**

L2: Entry 3 of 7

File: USPT

Apr 23, 2002

US-PAT-NO: 6377836

DOCUMENT-IDENTIFIER: US 6377836 B1

TITLE: RF coil array for vertical field MRI

DATE-ISSUED: April 23, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Arakawa; Mitsuaki	Hillsborough	CA		
Carlson; Joseph W.	Kensington	CA		
Kaufman; Leon	San Francisco	CA		
Reveaux; James V.	San Francisco	CA		

US-CL-CURRENT: 600/422; 324/318, 324/322

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWC	Draw D
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☐ 2. Document ID: US 5610520 A Relevance Rank: 53

L2: Entry 7 of 7

File: USPT

Mar 11, 1997

US-PAT-NO: 5610520

DOCUMENT-IDENTIFIER: US 5610520 A

TITLE: Automatic orthogonality adjustment device for a quadrature surface coil for magnetic resonance imaging or spectroscopy

DATE-ISSUED: March 11, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Misic; George J.	Novelty	OH		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Medrad Inc.	Pittsburgh	PA			02

APPL-NO: 08/201862 [PALM]  
DATE FILED: February 24, 1994

INT-CL-ISSUED: [06] G01 V 3/00, G01 V 3/14

US-CL-ISSUED: 324/318; 324/322  
US-CL-CURRENT: 324/318; 324/322

FIELD-OF-CLASSIFICATION-SEARCH: 324/318, 324/319, 324/322, 324/300, 324/314, 364/413.13  
See application file for complete search history.

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4467282</u>	August 1984	Siebold	
<u>4712069</u>	December 1987	Kemner et al.	
<u>4721913</u>	January 1988	Hyde et al.	
<u>4763074</u>	August 1988	Fox	324/318 X
<u>4816765</u>	March 1989	Boskamp	
<u>4820985</u>	April 1989	Eash	324/318
<u>4918388</u>	April 1990	Mehdizadeh et al.	
<u>5041790</u>	August 1991	Tropp	324/318
<u>5202634</u>	April 1993	Potthast	324/322
<u>5221901</u>	June 1993	Derke	324/318
<u>5394087</u>	February 1995	Molyneaux	324/318
<u>7752736</u>	June 1988	Arakawa et al.	

ART-UNIT: 225

PRIMARY-EXAMINER: O'Shea; Sandra L.

ASSISTANT-EXAMINER: Haynes; Mack

ATTY-AGENT-FIRM: Keck, Mahin & Cate

ABSTRACT:

An MRI/MRS magnetic coil system is disclosed wherein the isolation between the coils can be adjusted to decrease or virtually eliminate the coupling between quadrature magnetic resonance imaging coils in order to optimize orthogonality between the coils. The adjustment allows the use of flexible coils which may be conformed to image specific anatomical regions. The RF characteristics of the coils are controlled by variable capacitors. The capacitors are controlled by a remote automatic controller which functions to adjust the RF characteristics of the coils until an optimal orthogonality and signal to noise ratio is achieved between and by

the coils.

28 Claims, 8 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference		Claims	DOC	Unsol
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☐ 3. Document ID: US 6714013 B2 Relevance Rank: 53

L2: Entry 2 of 7

File: USPT

Mar 30, 2004

US-PAT-NO: 6714013

DOCUMENT-IDENTIFIER: US 6714013 B2

**\*\* See image for Certificate of Correction \*\***

TITLE: Magnetic resonance imaging receiver/transmitter coils

DATE-ISSUED: March 30, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Misic; George J.	Allison Park	PA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Medrad, Inc.	Indianola	PA			02

APPL-NO: 10/151491 [PALM]

DATE FILED: May 20, 2002

PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS This application for patent is a continuation of U.S. application Ser. No. 09/776,132, filed Feb. 2, 2001, now issued as U.S. Pat. No. 6,396,273 on May 28, 2002. The '132 application is a continuation of U.S. application Ser. No. 09/512,093, filed Feb. 24, 2000, now abandoned, which is a divisional of U.S. application Ser. No. 08/979,842, filed Nov. 26, 1997, now issued as U.S. Pat. No. 6,040,697 on Mar. 21, 2000. The contents of the aforementioned documents are incorporated herein by reference.

INT-CL-ISSUED: [07] G01 N 3/00

US-CL-ISSUED: 324/318; 324/322

US-CL-CURRENT: 324/318; 324/322

FIELD-OF-CLASSIFICATION-SEARCH: 324/318, 324/322, 324/300, 324/306, 324/307, 324/309, 324/312, 324/314

See application file for complete search history.

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS



PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4411270</u>	October 1983	Damadian	
<u>4467282</u>	August 1984	Siebold	
<u>4680548</u>	July 1987	Edelstein et al.	
<u>4692705</u>	September 1987	Hayes	
<u>4707664</u>	November 1987	Fehn et al.	
<u>4793356</u>	December 1988	Misic et al.	
<u>4825162</u>	April 1989	Roemer et al.	
<u>4833429</u>	May 1989	Keren et al.	333/156
<u>4923459</u>	May 1990	Nambu	
<u>5179332</u>	January 1993	Kang	
<u>5258717</u>	November 1993	Misic et al.	
<u>5374890</u>	December 1994	Zou et al.	
<u>5394087</u>	February 1995	Molyneaux	
<u>5483158</u>	January 1996	van Heteren et al.	
<u>5543711</u>	August 1996	Srinivasan et al.	
<u>5551430</u>	September 1996	Blakeley et al.	
<u>5559434</u>	September 1996	Takahashi et al.	
<u>5565779</u>	October 1996	Arakawa et al.	
<u>5578925</u>	November 1996	Molyneaux et al.	
<u>5602479</u>	February 1997	Srinivasan et al.	
<u>5610521</u>	March 1997	Zou et al.	
<u>5621323</u>	April 1997	Larsen	
<u>5646531</u>	July 1997	Renz	
<u>5664568</u>	September 1997	Srinivasan et al.	
<u>5696449</u>	December 1997	Boskamp	
<u>5998999</u>	December 1999	Richard et al.	
<u>6028429</u>	February 2000	Green et al.	324/318
<u>6040697</u>	March 2000	Misic	
<u>6137291</u>	October 2000	Szumowski et al.	
<u>6150816</u>	November 2000	Srinivasan	
<u>6177797</u>	January 2001	Srinivasan	
<u>6249121</u>	June 2001	Boskamp et al.	324/318
<u>6323648</u>	November 2001	Belt et al.	324/322

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0 758 091	February 1997	EP	
WO 98/37438	August 1998	EP	

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Reykowski, A., et al., "Novel Two Channel Volume Array Design for Angiography of the Head and Neck," Proceedings of the Society of Magnetic Resonance, Second Meeting, vol. 1, p. 216 (Aug. 6-12, 1994).

Reykowski, A., Theory and Design of Synthesis Array Coils for Magnetic Resonance Imaging, (see pp. 162-191), Dissertation submitted to the Office of Graduate Studies of Texas A&M University (Dec. 1996).

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Complaint, Civil Action No. 02-2044, Medrad, Inc., (Plaintiff) v. MRI Devices Corporation (Defendant), Patent Infringement of Medrad's Patent USPN 6,396,273 (Nov. 25, 2002).

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MRI Devices Corporation's Response to Medrad's First Set of Interrogatories, Civil Action No. 02-2044 (Jan. 20, 2002).

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Expert Report of Dr. Peter B. Roemer Concerning Invalidity of Claims 1, 2, 3, 5, 16, and 23 of U.S. Patent 6,396,273, Civil Action 02-2044 (Mar. 14, 2003).

"Optimized Birdcage Resonators for Simultaneous MRI of Head and Neck," Proceedings of the Society of Magnetic Resonance, p. 1349 (1993).

"Surface Coil Proton MR Imaging at 2T," Radiology, 161, No. 1, pp. 251-255, (Oct. 1986).

"Spatial Localization in 31P and 13C NMR Spectroscopy in vivo Using Surface Coils,"

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"Comparison of Linear and Circular Polarization for Magnetic Resonance Imaging,"  
Journal of Magnetic Resonance 64, 255-270 (1985).  
Transcript of Testimony of Dr. Arne Reykowski at the Hearing ("Reykowski  
Transcript").  
Deposition of Dr. Gregor Adriany ("Adriany Deposition").  
Expert Report of Dr. Peter B. Roemer Concerning Noninfringement of Claims 1, 2, 3,  
5, 16 and 23 of U.S. Patent No. 6,396,273 ("Roemer Noninfringement Report").  
Expert Report of Kimberly A. Moore ("Moore Report").  
MRI Devices' Motion for Summary Judgment of Noninfringement of the '273 Patent  
("MRIDC's SJ Motion of Noninfringement").  
MRI Devices' Memorandum Supporting Its Motion for Summary Judgment of  
Noninfringement of the '273 Patent ("MRIDC's Memo Supporting SJ Motion of  
Noninfringement").  
MRI Devices' Motion for Summary Judgment to Invalidate Claims 1, 2, 3, 5, 16 and 23  
of U.S. Patent No. 6,396,273 ("MRIDC's SJ Motion to Invalidate").  
MRI Devices' Memorandum Supporting Its Motion for Summary Judgment to Invalidate  
Claims 1, 2, 3, 5, 16 and 23 of U.S. Patent No. 6,396,273 (MRIDC's Memo Supporting  
Invalidity Motion).  
Appendix In Support of MRI Devices' Motion for Summary Judgment to Invalidate  
Claims 1, 2, 3, 5, 16 and 23 of U.S. Patent No. 6,396,273 ("MRIDC's Appendix to  
Invalidity Motion").  
Medrad's Opposition to MRI Devices' Motion for Partial Summary Judgment to  
Invalidate Certain Claims of U.S. Patent No. 6,396,273 ("Medrad's Opposition to  
MRIDC's SJ Motion To Invalidate").  
MRI Devices' Reply Supporting Its Motion for Summary Judgment to Invalidate All  
Asserted Claims of U.S. Patent No. 6,396,273 ("MRIDC's Reply").  
Appendix In Support of MRI Devices' Reply Supporting Its Motion for Summary  
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Appendix to Reply").  
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McVerry ("Magistrate's Report and Recommendation").  
Plaintiff Medrad's Supplemental Responses to Defendant's First Set of  
Interrogatories (Mar. 26, 2003).  
Expert Report of Dr. Cecil E. Hayes Pursuant to Rule 26(a)(2)(B) of the Federal  
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P. B. Roemer, et al., "The NMR Phased Array," Magnetic Resonance in Medicine, vol.  
16, Copyright 1990, Academic Press, Inc., pp. 192-225.  
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J. Jin, et al., "An Innovative Design of Combined Transmit/Receive RF Coil for MR  
Imaging," Department of Electrical and Computer Engineering, University of Illinois  
at Urbana-Champaign, Urbana, IL, Phillips Medical Systems North America, Shelton,  
CT, Aug. 1994, p. 1116, XP 002092172.  
International Search Report for Counterpart PCT Application No. PCT/US98/23454.  
"Knee Foot and Ankle Array," produced and sold by MRI Devices Corporation of  
Waukesha, WI, under Model No. KFA, Product Data Jul. 2000, CE0413.  
Memorandum Order, Medrad, Inc. vs. MRI Devices Corporation, Civil Action No. 02-  
2044, Aug. 13, 2003.

ART-UNIT: 2862

PRIMARY-EXAMINER: Arana; Louis

ATTY-AGENT-FIRM: Bradley; Gregory L. Stevenson; James R.

## ABSTRACT:

A magnetic resonance imaging receiver/transmitter coil system for providing images for regions of interest includes a first phased array formed of a plurality of electrically conductive members and defining an array volume and a second phased array formed of a second plurality of electrically conductive members and disposed at least partially within the defined array volume. At least one of the first and second phased arrays is adapted to apply a magnetic field to the defined array volume. At least one of the first and second phased arrays is further adapted to receive said applied magnetic field. The first phased array is extendible to define a further array volume and is provided with a switch for electrically coupling and decoupling an extension to effectively extend the length of the first phased array and thereby define the further array volume. In this manner the length of the first phased array is effectively extended to approximately twice its unextended length.

83 Claims, 7 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	Revd	Drawings
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☐ 4. Document ID: US 6806711 B2      Relevance Rank: 53

L2: Entry 1 of 7

File: USPT

Oct 19, 2004

US-PAT-NO: 6806711

DOCUMENT-IDENTIFIER: US 6806711 B2

TITLE: High-frequency volume coil/surface coil arrangement for a magnetic resonance tomography apparatus

DATE-ISSUED: October 19, 2004

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Reykowski; Arne	Erlangen			DE

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Siemens Aktiengesellschaft	Munich			DE	03

APPL-NO: 10/152895      [PALM]

DATE FILED: May 21, 2002

## FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
DE	101 26 338	May 30, 2001

INT-CL-ISSUED: [07] G01 V 3/00

US-CL-ISSUED: 324/318

US-CL-CURRENT: 324/318

FIELD-OF-CLASSIFICATION-SEARCH: 324/300-309, 324/311, 324/314, 324/318-322,  
600/410, 600/422, 333/219, 333/230  
See application file for complete search history.

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4623844</u>	November 1986	Macovski	324/320
<u>4680549</u>	July 1987	Tanttu	
<u>4879516</u>	November 1989	Mehdizadeh et al.	324/318
<u>4918388</u>	April 1990	Mehdizadeh et al.	324/322
<u>5059906</u>	October 1991	Yamanaka	324/318
<u>5198768</u>	March 1993	Keren	324/318
<u>5394087</u>	February 1995	Molyneaux	324/318
<u>5473251</u>	December 1995	Mori	324/318
<u>5500596</u>	March 1996	Grist et al.	324/318
<u>5617027</u>	April 1997	Decke	
<u>5666055</u>	September 1997	Jones et al.	324/318
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<u>5699802</u>	December 1997	Duerr	
<u>5757189</u>	May 1998	Molyneaux et al.	324/318
<u>5951474</u>	September 1999	Matsunaga et al.	600/422
<u>6060882</u>	May 2000	Doty	324/318
<u>6169401</u>	January 2001	Fujita et al.	324/318
<u>6300761</u>	October 2001	Hagen et al.	324/318
<u>6317091</u>	November 2001	Oppelt	343/742
<u>6377044</u>	April 2002	Burl et al.	324/307
<u>6504369</u>	January 2003	Varjo et al.	324/318
<u>6624633</u>	September 2003	Zou et al.	324/318
<u>2002/0196021</u>	December 2002	Wang	324/318
<u>2003/0060699</u>	March 2003	Creemers	600/410

ART-UNIT: 2859

PRIMARY-EXAMINER: Fulton; Christopher W.

ASSISTANT-EXAMINER: Vargas; Dixomara

ATTY-AGENT-FIRM: Schiff Hardin LLP

ABSTRACT:

High-frequency coil arrangement for a magnetic resonance tomography apparatus and magnetic resonance tomography apparatus employing such an arrangement have a surface coil and a loop coil for enclosing the examination subject. Both coils are fashioned for receiving the same first polarization component. A switching device

is present for alternately deactivating and/or activating the surface coil and the loop coil. The two coils are preferably arranged on a common carrier structure that is bendable.

24 Claims, 7 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	FIG	Draw
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☐ 5. Document ID: US 6137291 A Relevance Rank: 53

L2: Entry 4 of 7

File: USPT

Oct 24, 2000

US-PAT-NO: 6137291

DOCUMENT-IDENTIFIER: US 6137291 A

TITLE: Telescoping coil array for magnetic resonance imaging of extremities

DATE-ISSUED: October 24, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Szumowski; Jerzy	Portland	OR		
Kojima; Kryss	Portland	OR		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Oregon Health Sciences University	Portland	OR			02

APPL-NO: 08/914483 [PALM]

DATE FILED: August 19, 1997

PARENT-CASE:

RELATED APPLICATION This application claims priority from our now abandoned provisional application Ser. No. 601,024,138, filed Aug. 19, 1996.

INT-CL-ISSUED: [07] G01 V 3/00

US-CL-ISSUED: 324/318; 600/422

US-CL-CURRENT: 324/318; 600/422

FIELD-OF-CLASSIFICATION-SEARCH: 324/318, 324/319, 324/320, 324/322, 324/300, 324/307, 324/309, 600/422, 600/423

See application file for complete search history.

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO

ISSUE-DATE

PATENTEE-NAME

US-CL

<u>4721913</u>	January 1988	Hyde et al.	
<u>4825162</u>	April 1989	Roemer et al.	
<u>4985678</u>	January 1991	Gangarosa et al.	
<u>5049821</u>	September 1991	Duensing et al.	324/322
<u>5252922</u>	October 1993	Larson, III	
<u>5277183</u>	January 1994	Vij	324/318
<u>5361764</u>	November 1994	Reynolds et al.	324/318
<u>5394087</u>	February 1995	Molyneaux	
<u>5399970</u>	March 1995	Pelc et al.	
<u>5500596</u>	March 1996	Grist et al.	
<u>5548218</u>	August 1996	Lu	
<u>5578925</u>	November 1996	Molyneaux et al.	
<u>5594337</u>	January 1997	Boskamp	324/318

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Monroe et al., Phased Array Coils for Upper Extremity MRA, MRM 33:224-229, 1995.

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Kneeland et al., High-Resolution MR Imaging with Local Coils, RSNA, 1989, pp. 1-7.

Kulkarni et al., Technical Considerations for the Use of Surface Coils in MRI, AJR 147:373-378, Aug. 1986.

Rajan et al., An Extended-Length Coil Design for Peripheral MR Angiography, Magnetic Resonance Imaging , vol. 9, pp. 493-495, 1991.

Ginsberg et al., Optimum Geometry of Saddle Shaped Coils for Generating a Uniform Magnetic Field, The Review of Scientific Instruments, vol. 14, No. 1, Jan. 1970., pp. 122-123.

ART-UNIT: 282

PRIMARY-EXAMINER: Arana; Louis

ATTY-AGENT-FIRM: Klarquist Sparkman Campbell Leigh &amp; Whinston, LLP

## ABSTRACT:

An MR coil array includes a plurality of telescopically arranged coil units, spanning the length of an extremity (e.g. a leg). The coil in each unit encircles the extremity, providing good SNR from all sides and for deep structures as well. The tapered shape of the array conforms generally to the patient anatomy, minimizing sensing distances, further enhancing SNR. A low ratio between the volume

imaged and the aggregate coil conductor length further contributes to high SNR. A multiplicity of tuning capacitors makes the array relatively insensitive to detuning by differently-sized patients. Adjoining coils can be oriented to produce perpendicular magnetic fields, reducing coupling therebetween. An apparatus employing two such coil arrays allows imaging of two extremities at once.

7 Claims, 10 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	Keywords	Drawings
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☐ 6. Document ID: US 5898306 A Relevance Rank: 53

L2: Entry 6 of 7

File: USPT

Apr 27, 1999

US-PAT-NO: 5898306

DOCUMENT-IDENTIFIER: US 5898306 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Single circuit ladder resonator quadrature surface RF coil

DATE-ISSUED: April 27, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Liu; Haiying	Minneapolis	MN		
Truwit; Charles L.	Wayzata	MN		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Regents of the University of Minnesota	Minneapolis	MN			02	

APPL-NO: 08/838604 [PALM]

DATE FILED: April 9, 1997

INT-CL-ISSUED: [06] G01 V 3/00

US-CL-ISSUED: 324/322; 324/318

US-CL-CURRENT: 324/322; 324/318

FIELD-OF-CLASSIFICATION-SEARCH: 324/318, 324/322, 324/300, 324/314, 324/312, 324/307, 324/309

See application file for complete search history.

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4707664</u>	November 1987	Fehn et al.	324/322



<u>4721913</u>	January 1988	Hyde et al.	324/318
<u>4752738</u>	June 1988	Patrick et al.	324/318
<u>4816765</u>	March 1989	Boskamp	324/318
<u>4839594</u>	June 1989	Misic et al.	324/318
<u>4879516</u>	November 1989	Mehdizadeh et al.	324/318
<u>4881032</u>	November 1989	Bottomley et al.	324/309
<u>4906933</u>	March 1990	Keren	324/318
<u>4918388</u>	April 1990	Mehdizadeh et al.	324/322
<u>4931734</u>	June 1990	Kemner et al.	324/318
<u>4985678</u>	January 1991	Gangarosa et al.	324/318
<u>5030915</u>	July 1991	Boskamp et al.	324/318
<u>5045792</u>	September 1991	Mehdizadeh	324/318
<u>5144240</u>	September 1992	Mehdizadeh et al.	324/318
<u>5160891</u>	November 1992	Keren	324/318
<u>5196796</u>	March 1993	Misic et al.	324/322
<u>5212450</u>	May 1993	Murphy-Boesch et al.	324/322
<u>5235277</u>	August 1993	Wichern	324/318
<u>5280248</u>	January 1994	Zou et al.	324/318
<u>5285160</u>	February 1994	Loos et al.	324/318
<u>5365173</u>	November 1994	Zou et al.	324/322
<u>5374890</u>	December 1994	Zou et al.	324/318
<u>5394087</u>	February 1995	Molyneaux	324/318
<u>5430378</u>	July 1995	Jones	324/318
<u>5521506</u>	May 1996	Misic et al.	324/322

## OTHER PUBLICATIONS

Ballon, D., et al., "A 64 MHz Half-Birdcage Resonator for Clinical Imaging", J. of Magnetic Resonance, 90, 131-140, (1990).  
Hu, X., et al., "Reduction of Field of View for Dynamic Imaging", Magnetic Resonance in Medicine, 31, No. 6, 691-694, (1994).  
Mehdizadeh, M., "RF Coils for Magnetic Resonance Imaging", RF Design, 29-38, (1991).  
Panych, L.P., et al., "A Dynamically Adaptive Imaging Algorithm for Wavelet-Encoded MRI", Magnetic Resonance in Medicine, 32, No. 6, 738-746, (1994).

ART-UNIT: 287

PRIMARY-EXAMINER: Arana; Louis

ATTY-AGENT-FIRM: Schwegman, Lundberg, Woessner, and Kluth, P.A.

## ABSTRACT:

A single-circuit quadrature surface coil is formed from two ladder resonator coils and includes a first mode circuit path for detecting or generating magnetic flux in a vertical axis from a body under investigation and a second mode circuit path for detecting or generating magnetic flux in a parallel axis, with the first mode and second mode currents 90 degrees out of phase. The surface coil, which supports two resonance current modes for quadrature operation on only one single coil conductor structure, provides a high signal-to-noise ratio (SNR) and a good B.sub.1

homogeneity over the imaging volume. This coil alone may be used either for both transmitting and receiving RF signals or for detecting RF signals as "receive only." This coil is well suited for imaging the human neck, spine and heart.

17 Claims, 7 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	FIGS	Draw D
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☐ 7. Document ID: US 5951474 A      Relevance Rank: 53

L2: Entry 5 of 7

File: USPT

Sep 14, 1999

US-PAT-NO: 5951474

DOCUMENT-IDENTIFIER: US 5951474 A

TITLE: Magnetic resonance imaging apparatus for detecting magnetic resonance signals by radio frequency receiving coils

DATE-ISSUED: September 14, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Matsunaga; Yoshikuni	Hachioji			JP
Takahashi; Tetsuhiko	Soka			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Hitachi Medical Corporation	Tokyo			JP	03

APPL-NO: 08/804925    [PALM]

DATE FILED: February 24, 1997

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	8-129316	April 26, 1996

INT-CL-ISSUED: [06] A61 B 5/055

US-CL-ISSUED: 600/422; 324/318, 324/322

US-CL-CURRENT: 600/422; 324/318, 324/322

FIELD-OF-CLASSIFICATION-SEARCH: 128/653.2, 128/653.5, 324/318, 324/322, 600/410, 600/422

See application file for complete search history.

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4733190</u>	March 1988	Dembrinski	324/318
<u>4739269</u>	April 1988	Kopp	324/318
<u>4918388</u>	April 1990	Mehdizadeh	324/322
<u>4920318</u>	April 1990	Misic et al.	324/318
<u>5198768</u>	March 1993	Keren	324/318
<u>5270656</u>	December 1993	Roberts et al.	324/318
<u>5277183</u>	January 1994	Vij	128/653.5
<u>5296813</u>	March 1994	Holmes et al.	324/322
<u>5307806</u>	May 1994	Jones	128/653.5
<u>5351688</u>	October 1994	Jones	128/653.5
<u>5361765</u>	November 1994	Herihy	128/653.5
<u>5370118</u>	December 1994	Vij	128/653.5
<u>5394087</u>	February 1995	Molyneaux	324/318
<u>5465719</u>	November 1995	Itagaki et al.	128/653.5
<u>5473251</u>	December 1995	Mori	324/318
<u>5500596</u>	March 1996	Grist et al.	324/318
<u>5502387</u>	March 1996	McGill	324/318
<u>5581185</u>	December 1996	Petropoulos et al.	324/318
<u>5655533</u>	August 1997	Petropoulos et al.	128/653.5

## FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	CLASS
0565178 A1	January 1993	EP	

## OTHER PUBLICATIONS

"A Highly Sensitive Multiple RF Coil For Magnetic Resonance Imaging", T. Takahashi et al, Research & Development Center, Hitachi Medical Corporation, pp. 215-217.

ART-UNIT: 377

PRIMARY-EXAMINER: Jaworski; Francis J.

ASSISTANT-EXAMINER: Mercader; Eleni Mantis

ATTY-AGENT-FIRM: Antonelli, Terry, Stout & Kraus, LLP

## ABSTRACT:

RF receiving coil device used in a magnetic resonance imaging apparatus capable of acquiring a tomographic image of an object under examination positioned in a static magnetic field along a predetermined direction including quadrature detection coils for detecting an MR signal component along a direction perpendicular to a body axis direction of the object under examination and also perpendicular to a direction of the static magnetic field, and for detecting another MR-signal component along the body axis direction.

24 Claims, 13 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	NOAC	Drawings
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Term	Documents
SADDLE	70319
SADDLES	14191
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(L1 AND SADDLE ) . PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD.	7

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324/304	183
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